REMARKS

In the Office Action mailed January 29, 2003, Claims 1-23 were pending in this application. The office action summary indicates that Claims 1-23 are rejected, and the drawings were objected to in regard to Claim 4. Specifically, Claim 21 was rejected under 35 U.S.C. §112, Claims 21-23 were rejected under 35 U.S.C. §102(b), Claims 1-3 and 5-20 were rejected under 35 U.S.C. §103(a), and Claim 4 was rejected under 35 U.S.C. §103(a).

Applicants have added new Claims 24-27 to round out the protection to which Applicants are entitled. Applicants submit that Claims 24-27 are supported by the application as filed and do not add new matter. As shown herein Claims 24-27 recite additional elements not present in the cited art and are therefor patentable over the cited art.

Claims 1-27 are now pending in this application.

Applicants respectfully traverses the rejections and amends the claims to further distinguish or clarify the differences with respect of the cited prior art references. Applicants respectfully submit that the claims as amended recite limitations that are not taught or suggested by the references.

Each objection or rejection is now addressed in further detail.

Drawings

The drawings were objected to under 37 CFR 1.83(a) with the Examiner suggesting that limitation of Claim 4 are not shown in the drawings. More specifically, Examiner suggests Claim 4 limitations of *"aborting the method for managing access when said response indicates failure to reserve and said first controller is subordinate to said second controller; otherwise, delaying and communicating again a reservation request for said logical I/O device when said response indicates failure to reserve and said first controller is dominant to said second controller"* are not shown in the drawings.

Claim 4 recites a first limitation directed toward *"aborting the method for managing access when said response indicates failure to reserve and said first controller is subordinate to said second controller"*, and a second limitation directed toward *"delaying and communicating again a reservation request for said logical I/O device when said response indicates failure to reserve and said first controller is dominant to said second controller"*.

Applicants have reviewed Figure 10 and find support for both the first limitation and the second limitation as recited in Claim 4. More specifically, the first limitation directed toward *"aborting the method for managing access when said response indicates failure to*

reserve and said first controller is subordinate to said second controller" is shown in part as *"1050 Has This Node Priority?"* within Figure 10, and is further described in part within the Applicants specification on page 24, lines 14-22.

The second limitation directed toward *"delaying and communicating again a reservation request for said logical I/O device when said response indicates failure to reserve and said first controller is dominant to said second controller"* is shown in part as *"1045 Delay."* within Figure 10, and is further described in part within the Applicants specification on page 24, lines 14-22.

Applicants respectfully submit that the limitations of Claim 4 are shown within Figure 10, and trust that the objection to the drawings under 37 CFR 1.83(a) will be withdrawn.

35 U.S.C. §112 Rejection

The Examiner has rejected Claim 21 under 35 U.S.C. §112. The Examiner suggests that Claims 21 is indefinite for failing to particularly point out and distinctly claim the subject matter that applicants regard as the invention. Claim 21 has been amended to clarify the limitation "an Input/output device" with "the Input/output device". Applicants trust that with this amendment the 35 U.S.C. §112 rejection will be withdrawn.

35 U.S.C. §102 Rejections

Claims 21-23 were rejected under 35 U.S.C. §102(b) as being anticipated by Judd et al. U.S. Patent No. 5,768,623 (hereinafter "Judd").

Judd discloses a "system for storing data for a plurality of host computers on a plurality of storage arrays so that data on each storage array can be accessed by any host computer" (Abstract, lines 1-3).

In contrast, Applicants' amended claim 21 recites *"An apparatus for managing access to [an] a logical input/output device, said apparatus comprising: a communications link coupling first and second nodes each having respective first and second bus controllers to the logical input[an i nput]/output device; input logic on said first controller receiving a request to reserve [said] the logical input/output device; and communications logic communicating from said first controller to said second controller a reservation request for [said] the logical input/output device for execution by said second controller, in response to said receiving"*.

As the Examiner is aware, for a reference to anticipate a claim, the reference must teach every element of the claim (see M.P.E.P §2131).

Applicants respectfully submit that Judd does not teach every element of Applicants' amended claim 21 including a *"a communications link coupling first and second nodes each having respective first and second bus controllers to the logical input/output device"*, *"input*

logic on said first controller receiving a request to reserve the logical input/output device", and *"communications logic communicating from said first controller to said second controller a reservation request for the logical input/output device for execution by said second controller, in response to said receiving"*.

In contrast, Judd discloses that locking is performed at a physical disk level. More specifically, Judd discloses "All disks to be switched over are locked, for example with a SCSI reserve command" (Judd, Column 8, lines 54-56). Such a system, as disclosed by Judd, is not capable of managing access to a logical input/output device, in contrast Judd apparently requires access at a physical disk level.

As suggested by the applicants background specification section, the Reserve() command is passed to <u>all the physical disks</u> that compose the target, and is inefficient. More specifically, Applicants provide *"Where the SCSI target of a Reserve() command is a logical unit 2063 of an external RAID controller 2060 or where the SCSI target is a logical disk 130 depending from an internal RAID controller 2210, the controller 2060, 2210 still passes the Reserve() command to all of the disks 2061 that compose the target. This pass-through method, however, is patently inefficient, reserving more devices 2061 than the initiator 120 may require. The pass-through method also imposes limitations on a RAID configuration"* (Applicants specification, page 6 line 32 – page 7).

Applicants claim 21 is directed to an apparatus for managing access to a logical input/output device. Accordingly, the entire disk and/or multiple disks that may correspond with a logical input/output device are not unnecessarily locked. Applicants' claim 1 recites an *input logic on said first controller receiving a request to reserve the logical input/output device; and communications logic communicating from said first controller to said second controller a reservation request for the logical input/output device for execution by said second controller, in response to said receiving.*

Accordingly, Applicants respectfully submit that Judd fails to disclose all limitations of Applicants' amended claim 21 and the 35 U.S.C. §102(b) rejection of claims 21 as anticipated by Judd is improper and should be withdrawn.

Claim 22 is dependent from and includes all limitations of amended claim 21. Claim 22 is further amended to recite *"wherein the logical input/output device is selected from a plurality of logical input/output devices coupled with a physical input/output device"*. Judd does not disclose the limitations now recited. Applicants therefore respectfully submit that claim 22 as amended is patentable over Judd. For at least these reasons, the dependent Claims 22 is further distinguished from and allowable over the disclosure of Judd.

Claim 23 is dependent from and includes all limitations of claim 21. Claim 23 further recites *"wherein said communications link comprises a bus"*. Applicants therefore respectfully submit that claim 23 is patentable over Judd. For at least these reasons, the dependent Claims 23 is further distinguished from and allowable over the disclosure of Judd.

In summary, Applicants submit that Judd does not disclose or suggest all limitations of Applicants' claims 21, 22, and 23. Accordingly, the 35 U.S.C. §102(b) rejection of claims 21, 22, and 23 should be withdrawn.

35 U.S.C. §103 Rejection

The Examiner has rejected Claims 1-3 and 5-20 under 35 U.S.C. §103(a) as being unpatentable over Judd in view of Hammersley et al. U.S. Patent No. 5,392,433 (hereinafter "Hammersley").

Judd is generally directed to and describes a system for storing data for a plurality of host computers on a plurality of storage arrays so that data on each storage array can be accessed by any host computer (Abstract, lines 1-3). The data request is communicated through the adapter communication interface to the adapter primarily controlling the storage array in which the requested data is stored (Abstract, lines 12-15).

Hammersley is generally directed to a method for the intraprocess locking of a shared resource. (Abstract, lines 1-2). Generally this assures that only one process may use a shared computer resource, such as a magnetic storage device, at one time (Abstract, lines 8-11).

Claim 1

Claim 1 is an independent claim and has been amended herein. Applicants have taken the amendments made into account in responding to the Examiner's rejection.

Applicants note that three criteria must be met to establish a *prima facie* case of obviousness under 35 U.S.C. §103(a). First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. (See M.P.E.P. §2142). Applicants address these criteria as applied to the claims below.

As a general proposition, applicants respectfully submit that the cited art of Judd in view of Hammersley fails to disclose or suggest all of the claim limitations and that Claim 1 as amended is novel and not obvious in light of the cited prior art and therefore patentably distinct from it. In addition there is no suggestion or motivation to modify the references in a way that would provide applicant's invention as claimed, or any reasonable expectation that

if such references were combined such combination would lead to the invention with any degree of success.

Claim 1 recites *"receiving on said first controller a request to reserve said logical I/O device; and communicating by means of said bus from said first to said second controller a reservation request for said logical I/O device for execution by said second controller, in response to said receiving"*.

The Examiner suggests that Judd discloses (quoting the examiner) "a logical I/O device" and "receiving on said first controller a request to reserve said logical I/O device" (Examiner cites figure 7, and column 4, paragraph 3, lines 52-54).

Applicants have reviewed the cited portion of Judd and does not find any such specific disclosure or suggestion. Figure 7 specifically depicts disk storage devices 92..97, that are described as a disk array 92-97 (Judd, column 6, line 46). Column 4, paragraph 3, lines 21-23 state (taking the complete sentence contained therein): *"Adapter B executes the I/O request by searching its caches and accessing the disks if necessary."* Column 4, lines 52-54 states *"A link or bus refers to the connectors that are used to transmit data as signals over a transmission medium such as a copper wire."*

Based on the cited passages in Judd, it appears that the Examiner is equating a "disk storage device" of Judd with the claimed "logical I/O device", and "executes the I/O request" of Judd with the claimed "to reserve said logical I/O device".

Applicants respectfully submit that one of the features of the invention is that it provides "receiving on said first controller a request to reserve said logical I/O device" and "communicating by means of said bus from said first to said second controller a reservation request for said logical I/O device for execution by said second controller, in response to said receiving.

Applicants have amended Claim 1 to further clarify the logical I/O device as follows with emphasis by underlining added: *"A method for managing access to <u>a logical I/O</u> device, said method comprising: communicatively coupling first and second nodes, having respective first and second bus controllers, and <u>said</u> logical I/O device, by means of a bus and said first and second bus controllers; receiving on said first controller a request to reserve said logical I/O device; and communicating by means of said bus from said first to said second controller a reservation request for said logical I/O device for execution by said second controller, in response to said receiving."*

In contrast to the claimed invention, Judd merely discloses a disk array and executing the I/O request by searching its caches and accessing the disks if necessary. Applicants

submit that Judd does not disclose or suggest *"receiving on said first controller a request to reserve said logical I/O device"* and/or *"communicating by means of said bus from said first to said second controller a request for said logical I/O device for execution by said second controller, in response to said receiving"* as claimed and set forth above.

Applicants observe, at col. 6, lines 47-49 that Judd states: *"Each array 92-97 has a primary and secondary adapter to act as controller for that array."* Col. 6, lines 56-60 states: *"When the primary adapter is active the I/O requests are directed through the primary adapter. In the event the primary adapter card fails, the other hosts can still access the disk array through the secondary adapter."* While Applicants do not see the commonality, apparently the examiner is equating the Judd "disk array" to the claimed "logical I/O device". Applicants claimed "logical I/O device" is not the same as the Judd "disk array". As amended, claim 1 further clarifies *"A method for managing access to a logical I/O device"*.

As described above, Judd discloses that locking is performed at a physical disk level. More specifically, Judd discloses "All disks to be switched over are locked, for example with a SCSI reserve command" (Judd, Column 8, lines 54-56). Such a system, as disclosed by Judd, does not disclose managing access to a logical input/output device.

The Examiner ultimately concedes that Judd does not explicitly disclose the request is a reservation request. The Examiner however suggests that Hammersley teaches *"a reservation request on a shared resource (figures 5A1-2, 5B)"*. The Examiner further suggests, *"it would have been obvious to one having ordinary skill in the computer art to adopt Hammersley's teaching to Judd because Hammersley enables one to reserve one particular shared resource for exclusive usage."*

Applicants respectfully take exception to the interpretation of the citations to Hammersley and suggests that the Examiner has applied impermissible hindsight using knowledge of the claimed subject matter to read into Judd what is not actually present. For example, Judd col. 6, lines 48-50, and col. 8, lines 54-56 state: *"each array"* and *"all disks to be switched over are locked"*.

Noteably, neither of these cited passages from Judd mention a logical I/O device. Perhaps even more significantly, Applicants have not been able to find even a single reference to or use of the term "logical I/O device" anywhere within Judd or Hammersley. Therefore it is unclear as to the basis that either reference alone or the combination of the two references could teach anything about management of a logical I/O device.

Judd merely talks about "disks" and "disk arrays" it does not talk about "logical I/O devices" and therefore while it may teach some type of method for sharing multiple storage arrays, there is no disclosure, teaching, or suggestion that the data is managed at a logical I/O level as opposed to managed at a disk array level.

Hammersley merely talks about *"assuring that only one process may use a shared computer resource, such as a magnetic storage device"* and *"When one program executing within a process accesses a shared computer resource, it requests that the operating system lock out all other programs executing asynchronous within that process, as well as other processes executing within the computer system, from that shared resource"* (Hammersley Abstract). Hammersley does not talk about "logical I/O devices" and perhaps more importantly focuses on *"a shared computer resource, such as a magnetic storage device"*. While it may teach some type of method for the intraprocess locking of a shared resource, there is no disclosure, teaching, or suggestion that the data is managed according to a "logical I/O device" as opposed to managed at a magnetic storage or disk array level.

Applicants submit that while Hammersley may arguably disclose a reservation request as the Examiner suggests in figures 5A1-2, 5B, it does not teach or suggest *"receiving on said first controller a request to reserve said logical I/O device; and communicating by means of said bus from said first to said second controller a reservation request for said logical I/O device for execution by said second controller, in response to said receiving"*.

The Examiner suggests that it would have been obvious to a person of ordinary skill in the art at the time the present invention was made to adopt Hammersley's teachings to Judd because Hammersley enables one to reserve one particular shared resource for exclusive usage. Applicants respectfully disagree.

The reason or motivation for one skilled in the art to combine the teachings of Judd and Hammersley are unclear. Judd discloses a system for storing data for a plurality of host computers on a plurality of storage arrays.

The Examiner is apparently suggesting that Judd discloses the management of a logical I/O device and Hammersley discloses to reserve one particular shared resource for exclusive usage. Applicants can find no disclosure in Judd teaching or suggesting that logical I/O devices are managed. If there is such a teaching, Applicants request the Examiner identify a particular passage or passages in Judd providing such teaching. Applicants fail to see any motivation to adopt Hammersley's teaching to Judd as suggested by the Examiner.

Applicants submit that the cited art fails to disclose or suggest receiving on said first controller a request to reserve said logical I/O device; and communicating by means of said

bus from said first to said second controller a reservation request for said logical I/O device for execution by said second controller, in response to said receiving. The fundamental premise of Judd is to store data for a plurality of hosts computers on a plurality of storage arrays so that data on each storage array can be accessed by any host computer. Nowhere in Judd is there any suggestion of a need or desirability to manage access to a logical I/O device, in fact Judd teaches away from any suggestion of such need as the intent is to provide access to each storage array. A reference which leads one away from the claimed invention cannot render the invention obvious. See Dow Chemical v. American Cyanamid, 2 USPQ 2d 1350 (Fed. Cir. 1987).

Applicants submit that Judd and Hammersley do not disclose or suggest the limitations recited in Claim 1 and fail to establish a *prima facie* case of obviousness under 35 U.S.C. §103(a). For at least these reasons, Applicants submit that independent Claim 1 is distinguished from and allowable over the disclosure of Judd and Hammersley.

Dependent Claims 2-6

Claim 2 is dependent on independent Claim 1. Claim 2 is allowable for at least the same reasons as independent Claim 1, and further because the dependent claim adds the additional feature and limitation "further comprising the step of: reserving said logical I/O device for said first node within said second controller, in response to said communicated reservation request". For at least these reasons, Applicants submit that dependent Claim 2 is distinguished from and allowable over the disclosure of Judd and Hammersley.

Claim 3 is dependent on dependent Claim 2. Claim 3 is allowable for at least the same reasons as dependent Claim 2, and further because the dependent claim adds the additional feature and limitation of "wherein said step of reserving further comprises: determining whether said logical I/O device is already reserved within said second controller; communicating a response, indicating failure to reserve said logical I/O device, to said first node when said logical I/O device is already reserved; and otherwise, reserving said logical I/O device for said first node within said second controller, and communicating to said first node a response indicating success in reserving said logical I/O device". For at least these reasons, Applicants submit that dependent Claim 3 is distinguished from and allowable over the disclosure of Judd and Hammersley.

The examiner suggests that Judd discloses the determining whether said logical I/O device is already reserved within said second controller with citation to Judd column 11, lines 55-56. Applicants notes that Judd column 11, lines 55-56 provides "h) determining when the first adapter primarily controlling the first storage array is unavailable; and". Applicants

submit that this citation does disclose the limitation as recited in Claim 3. The citation appears to be directed to the availability of the primary adapter (a physical device) that controls the first storage array (another physical device). It does not disclose or suggest determining whether said logical I/O device is already reserved within said second controller.

Conceivably, the citation to Judd column 11, lines 55-56 may have included a typographical error. Applicants are therefore unable to fully compare the citation with the innovation as recited by Claim 3. Applicants respectfully request clarification.

Claim 5 is dependent on independent Claim 1. Claim 5 is allowable for at least the same reasons as independent Claim 1, and further because it adds the additional feature and limitation "wherein said step of communicatively coupling further comprises: communicatively coupling said first and second nodes and said logical I/O device depending from a multi-logical-device, third controller by means of said bus and said first and second controllers". For at least these reasons, Applicants submit that dependent Claim 5 is distinguished from and allowable over the disclosure of Judd and Hammersley.

Claim 6 is dependent on independent Claim 1. Claim 6 is allowable for at least the same reasons as independent Claim 1, and further because the dependent claim adds the additional feature and limitation "wherein after said step of receiving and before said step of communicating, the following steps are performed: in response to said reservation request, determining whether said logical I/O device is already reserved within said first controller, and aborting said method for managing access when said logical I/O device is already reserved; and otherwise, reserving said logical I/O device for said first node within said first controller". For at least these reasons, Applicants submit that dependent Claim 6 is distinguished from and allowable over the disclosure of Judd and Hammersley.

Independent Claim 7

Claim 7 is an independent claim. The Examiner suggests that Claim 7 incorporates substantially similar subject matter as claimed in Claim 1 and rejects Claim 7 on the same basis. The applicants submit that Claim 1 is a method claim, whereas Claim 7 is a computer-readable medium claim, and more importantly that the cited art fails to disclose or suggest the specific "*receiving on said first controller a request to reserve said logical I/O device; and communicating in response to receiving said request, a reservation request for said logical I/O device from said first controller to a second controller of a second node for execution by said second controller*" recited by the Claim 7. The differences between the cited art and Claim 7 have been argued relative to Claim 1 and claims dependent therefrom. For at least these reasons, the independent Claim 7 is allowable.

Dependent Claims 8-10

Claim 8 is dependent on independent Claim 7. The Examiner suggests that Claim 8 incorporates substantially similar subject matter as claimed in Claim 2 and rejects Claim 8 on the same basis. The applicants submits that Claim 8 is an computer-readable medium claim, whereas Claim 2 is a method claim, and more importantly that the cited art fails to teach or suggest the specific reserving said logical I/O device for said first node within said second controller, in response to said reservation request communication recited by the Claim 8. The differences between the cited art and Claim 8 have been argued relative to Claim 1 and claims dependent therefrom. For at least these reasons, the dependent Claim 8 is allowable.

Claim 9 is dependent on dependent Claim 8. The Examiner suggests that Claim 9 incorporates substantially similar subject matter as claimed in Claim 3 and rejects Claim 9 on the same basis. The applicants submits that Claim 9 is an computer-readable medium claim, whereas Claim 3 is a method claim, and more importantly that the cited art fails to teach or suggest the specific "*instructions for: determining whether said logical I/O device is already reserved within said second controller; communicating a response, indicating failure to reserve said logical I/O device, to said first node when said logical I/O device is already reserved; and otherwise, reserving said logical I/O device for said first node within said second controller, and otherwise, reserving said logical I/O device for said first node within said second controller, and communicating to said first node a response indicating success in reserving said logical I/O device*" recited by the Claim 9. The differences between the cited art and Claim 9 have been argued relative to Claim 1 and claims dependent therefrom. For at least these reasons, the dependent Claim 9 is allowable.

Claim 10 is dependent on independent Claim 7. The Examiner suggests that Claim 10 incorporates substantially similar subject matter as claimed in Claim 6 and rejects Claim 10 on the same basis. The applicants submits that Claim 10 is an computer-readable medium claim, whereas Claim 6 is a method claim, and more importantly that the cited art fails to teach or suggest the specific "*instructions for: determining, in response to said reservation request, whether said logical I/O device is already reserved within said first controller, and aborting said method for managing access when said logical I/O device is already reserved; and otherwise, reserving said logical I/O device for said first node within said first controller*" recited by the Claim 10. The differences between the cited art and Claim 10 have been argued relative to Claim 1 and claims dependent therefrom. For at least these reasons, the dependent Claim 10 is allowable.

<u>Claim 11</u>

Amended Claim 11 is an independent claim. The Examiner suggests that Claim 11 incorporates substantially similar subject matter as claimed in Claim 7 and rejects Claim 11 on the same basis. The applicants submit that amended Claim 11 is a computer system claim, whereas Claim 7 is a computer-readable medium claim, and more importantly that the cited art fails to disclose or suggest the specific "*at least one logical I/O device; first and second nodes having respective first and second bus controllers, said first controller comprising: a computer-readable medium storing a computer program for managing access to said logical I/O device by a first node in said computer system, said computer program including instructions for: receiving on said first controller a request to reserve said logical I/O device; and communicating in response to receiving said request, a reservation request for said logical I/O device from said first controller to a second controller of a second node for execution by said second controller; a CPU, coupled to said computer-readable medium, for executing said computer program stored in said medium; and a bus communicatively coupling said first and second nodes and said logical I/O device by means of said first and second controllers*" recited by the amended Claim 11. The differences between the cited art and Claim 11 have been argued relative to Claim 7 and claims dependent therefrom. For at least these reasons, the independent Claim 11 is allowable.

<u>Claim 12</u>

Claim 12 is an independent claim. As a general proposition, applicants respectfully submit that the cited art of Judd in view of Hammersley fails to disclose or suggest all of the claim limitations and that Claim 12 as amended is novel and not obvious in light of the cited prior art and therefore patentably distinct from it. In addition there is no suggestion or motivation to modify the references in a way that would provide applicant's invention as claimed, or any reasonable expectation that if such references were combined such combination would lead to the invention with any degree of success.

Claim 12 as amended recites "*A method for managing access to a logical I/O device, said method comprising: communicatively coupling first and second nodes having respective first and second bus controllers, and said logical I/O device, by means of a bus and said first and second controllers; receiving, on said first controller, a request to release said logical I/O device; and communicating a release request for said logical I/O device over said bus from said first controller to said second controller for execution by said second controller, in response to said receipt of said request to release*".

The Examiner suggests that Judd discloses (quoting the examiner) "a logical I/O device" and "receiving on said first controller a request to reserve said logical I/O device" (Examiner cites figure 7, and column 4, paragraph 3, lines 52-54).

As indicated above, Applicants have reviewed the cited portion of Judd and does not find any such specific disclosure or suggestion. Figure 7 specifically depicts disk storage devices 92..97, that are identified as a disk array 92-97 (Judd, column 6, line 46). Column 4, paragraph 3, lines 21-23 state (taking the complete sentence contained therein): *"Adapter B executes the I/O request by searching its caches and accessing the disks if necessary."* Column 4, lines 52-54 states *"A link or bus refers to the connectors that are used to transmit data as signals over a transmission medium such as a copper wire."*

Based on the cited passages in Judd, it appears that the Examiner is equating a "disk storage device" of Judd with the claimed "logical I/O device", "executes the I/O request" of Judd with the claimed "to reserve said logical I/O device", and "a request to reserve" of Judd with the claimed "request to release".

Applicants respectfully submit that one of the features of the invention is that it provides *"receiving, on said first controller, a request to release said logical I/O device"* and *"communicating a release request for said logical I/O device over said bus from said first controller to said second controller for execution by said second controller, in response to said receipt of said request to release"*.

In contrast to the claimed invention, Judd merely discloses a disk array and executing the I/O request by searching its caches and accessing the disks if necessary. Applicants submit that Judd does not disclose or suggest *"receiving, on said first controller, a request to release said logical I/O device"* or the *"communicating a release request for said logical I/O device over said bus from said first controller to said second controller for execution by said second controller, in response to said receipt of said request to release"* as claimed and set forth above.

Applicants observe, at col. 6, lines 47-49 that Judd states: *"Each array 92-97 has a primary and secondary adapter to act as controller for that array."* Col. 6, lines 56-60 states: *"When the primary adapter is active the I/O requests are directed through the primary adapter. In the event the primary adapter card fails, the other hosts can still access the disk array through the secondary adapter."* While Applicants do not see the commonality, apparently the examiner is equating the Judd "disk array" to the claimed "logical I/O device". Applicants claimed "logical I/O device" is not the same as the Judd "disk array".

As described above, Judd discloses that locking is performed at a physical disk level. More specifically, Judd discloses "All disks to be switched over are locked, for example with a SCSI reserve command" (Judd, Column 8, lines 54-56). Such a system, as disclosed by Judd, does not disclose managing access to a logical input/output device.

The Examiner ultimately concedes that Judd does <u>not</u> explicitly disclose the request is a release request. The Examiner however suggests that Hammersley teaches *"a release request on a shared resource (figure 6)"*. The Examiner further suggests, *"it would have been obvious to one having ordinary skill in the computer art to adopt Hammersley's teaching to Judd because Hammersley enables one to free up one particular shared resource for exclusive usage."*

Applicants respectfully take exception to the interpretation of the citations to Hammersley and suggests that the Examiner has applied impermissible hindsight using knowledge of the claimed subject matter to read into Judd what is not actually present. For example, col. 6, lines 48-50, and col. 8, lines 54-56 state: *"each array"* and *"all disks to be switched over are locked"*.

Noteably, neither of these cited passages from Judd mention a logical I/O device. Perhaps even more significantly, Applicants have not been able to find even a single reference to or use of the term "logical I/O device" anywhere within Judd or Hammersley. Therefore it is unclear as to the basis that either reference alone or the combination of the two references could teach anything about management of a logical I/O device.

Judd merely talks about "disks" and "disk arrays" it does not talk about "logical I/O devices" and therefore while it may teach some type of method for sharing multiple storage arrays, there is no disclosure, teaching, or suggestion that the data is managed at a logical I/O level as opposed to managed at a disk array level.

Hammersley merely talks about *"assuring that only one process may use a shared computer resource, such as a magnetic storage device"* and *"When one program executing within a process accesses a shared computer resource, it requests that the operating system lock out all other programs executing asynchronous within that process, as well as other processes executing within the computer system, from that shared resource"* (Hammersley Abstract). Hammersley does not talk about "logical I/O devices" and perhaps more importantly focuses on *"a shared computer resource, such as a magnetic storage device"*. While it may teach some type of method for the intraprocess locking of a shared resource, there is no disclosure, teaching, or suggestion that the data is managed according to a "logical I/O device" as opposed to managed at a magnetic storage or disk array level.

Applicants submit that while Hammersley may arguably disclose a release request as the Examiner suggests in figures 6, it does not teach or suggest "*receiving, on said first controller, a request to release said logical I/O device; and communicating a release request for said logical I/O device over said bus from said first controller to said second controller for execution by said second controller, in response to said receipt of said request to release*".

The Examiner suggests that it would have been obvious to a person of ordinary skill in the art at the time the present invention was made to adopt Hammersley's teachings to Judd because Hammersley enables one to free up one particular shared resource from exclusive usage. Applicants respectfully disagree.

The reason or motivation for one skilled in the art to combine the teachings of Judd and Hammersley are unclear. Judd discloses a system for storing data for a plurality of host computers on a plurality of storage arrays.

The Examiner is apparently suggesting that Judd discloses the management of a logical I/O device and Hammersley discloses to free up one particular shared resource for exclusive usage. Applicants can find no disclosure in Judd teaching or suggesting that logical I/O devices are managed. If there is such a teaching, Applicants request the Examiner identify a particular passage or passages in Judd providing such teaching. Applicants fail to see any motivation to adopt Hammersley's teaching to Judd as suggested by the Examiner.

Applicants submit that the cited art fails to disclose or suggest receiving, on said first controller, a request to release said logical I/O device; and communicating a release request for said logical I/O device over said bus from said first controller to said second controller for execution by said second controller, in response to said receipt of said request to release. The fundamental premise of Judd is to store data for a plurality of hosts computers on a plurality of storage arrays so that data on each storage array can be accessed by any host computer. Nowhere in Judd is there any suggestion of a need or desirability to manage access to a logical I/O device, in fact Judd teaches away from any suggestion of such need as the intent is to provide access to each storage array. A reference which leads one away from the claimed invention cannot render the invention obvious. See Dow Chemical v. American Cyanamid, 2 USPQ 2d 1350 (Fed. Cir. 1987).

Applicants submit that Judd and Hammersley do not disclose or suggest the limitations recited in Claim 12 and fail to establish a *prima facie* case of obviousness under 35 U.S.C. §103(a). For at least these reasons, Applicants submit that independent Claim 12 is distinguished from and allowable over the disclosure of Judd and Hammersley.

<u>Dependent Claims 13-15</u>

Claim 13 is dependent on independent Claim 12. Claim 13 is allowable for at least the same reasons as independent Claim 12, and further because the dependent claim adds the additional feature and limitation "*wherein before said step of receiving, the following steps are performed: receiving on said first controller a request to reserve said logical I/O device; and communicating by means of said bus from said first to said second controller a reservation request for said logical I/O device for execution by said second controller, in response to said receiving a reservation request*". For at least these reasons, Applicants submit that dependent Claim 13 is distinguished from and allowable over the disclosure of Judd and Hammersley.

Claim 14 is dependent on independent Claim 12. Claim 14 is allowable for at least the same reasons as independent Claim 12, and further because the dependent claim adds the additional feature and limitation "*further comprising the step of: releasing said logical I/O device within said second controller, in response to said release request communication*". For at least these reasons, Applicants submit that dependent Claim 14 is distinguished from and allowable over the disclosure of Judd and Hammersley.

Claim 15 is dependent on independent Claim 12. Claim 15 is allowable for at least the same reasons as independent Claim 12, and further because the dependent claim adds the additional feature and limitation "*wherein said step of communicatively coupling comprises: communicatively coupling said first and second nodes and a logical device depending from a multi-logical-device, third controller by means of said bus and said first and second controllers*". For at least these reasons, Applicants submit that dependent Claim 15 is distinguished from and allowable over the disclosure of Judd and Hammersley.

Independent Claims 16

Claim 16 is an independent claim. The Examiner suggests that Claim 16 incorporates substantially similar subject matter as claimed in Claim 12 and rejects Claim 16 on the same basis. The applicants submits that Claim 16 is a computer-readable medium claim, whereas Claim 12 is a method claim, and more importantly that the cited art fails to teach or suggest the specific *"A computer-readable medium for data storage wherein is located a computer program for causing a first node in a computer system, having a first bus controller, to manage access to a logical I/O device in said computer system by: receiving on said first controller a request to release said logical I/O device; and communicating by means of a bus from said first controller to a second controller of a second node a release request for said logical I/O device for execution by said second controller, in response to said receiving"* recited by the Claim 16. The differences between the cited art and Claim 16 have been argued relative to Claim 12 and claims dependent therefrom. For at least these reasons, the independent Claim 16 is allowable.

Dependent Claim 17

Claim 17 is dependent on independent Claim 16. The Examiner suggests that Claim 17 incorporates substantially similar subject matter as claimed in Claim 12 and rejects Claim 17 on the same basis. The applicants submits that Claim 17 is a computer-readable medium claim, whereas Claim 12 is a method claim, and more importantly that the cited art fails to teach or suggest the specific *"wherein said computer program further manages access by: releasing said logical I/O device within said second controller, in response to said release request communication"* recited by the Claim 17. The differences between the cited art and Claim 17 have been argued relative to Claim 12 and claims dependent therefrom. For at least these reasons, the dependent Claim 17 is allowable.

Independent Claims 18-20

Claim 18 is an independent claim. The Examiner suggests that Claim 18 incorporates substantially similar subject matter as claimed in Claim 16 and rejects Claim 18 on the same basis. The applicants submits that Claim 18 is a computer system claim, whereas Claim 16 is a computer-readable medium claim, and more importantly that the cited art fails to teach or suggest the specific *"A computer system comprising: first and second nodes having respective first and second bus controllers, said first controller comprising the computer-readable medium of claim 16; and a CPU, coupled to said medium, for executing said computer program in said medium; the logical I/O device; and a bus communicatively coupling said first and second nodes and said logical I/O device by means of said first and*

second controllers" recited by the Claim 18. The differences between the cited art and Claim 18 have been argued relative to Claim 16 and claims dependent therefrom. For at least these reasons, the independent Claim 18 is allowable.

Claim 19 is an independent claim. The Examiner suggests that Claim 19 incorporates substantially similar subject matter as claimed in Claim 7 and rejects Claim 19 on the same basis. The applicants submits that Claim 19 is an apparatus claim, whereas Claim 7 is a computer-readable medium claim, and more importantly that the cited art fails to teach or suggest the specific "*An apparatus for managing access to a logical I/O device, said apparatus comprising: means for communicatively coupling first and second nodes, having respective first and second bus controllers, and a logical I/O device; means for receiving on said first controller a request to reserve said logical I/O device; and means for communicating from said first to said second controller a reservation request for said logical I/O device for execution by said second controller, in response to said receiving*" recited by the Claim 19. The differences between the cited art and Claim 19 have been argued relative to Claim 7 and claims dependent therefrom. For at least these reasons, the independent Claim 19 is allowable.

Claim 20 is an independent claim. The Examiner suggests that Claim 20 incorporates substantially similar subject matter as claimed in Claim 16 and rejects Claim 20 on the same basis. The applicants submits that Claim 20 is an apparatus claim, whereas Claim 16 is a computer-readable medium claim, and more importantly that the cited art fails to teach or suggest the specific "*An apparatus for managing access to a logical I/O device, said apparatus comprising: means for communicatively coupling first and second nodes, having respective first and second bus controllers, and a logical I/O device; means for receiving on said first controller a request to release said logical I/O device; and means for communicating by means of said bus from said first to said second controller a release request for said logical I/O device for execution by said second controller, in response to said receiving*" recited by the Claim 20. The differences between the cited art and Claim 20 have been argued relative to Claim 16 and claims dependent therefrom. For at least these reasons, the independent Claim 20 is allowable.

Dependent Claim 4

The Examiner has rejected Claim 4 under 35 U.S.C. §103(a) as being unpatentable over Judd in view of Hammersley, and in further view of Barlow (U.S. Patent No. 4,096,569 (hereinafter "Barlow").

Barlow is generally directed to and describes a system having distributed priority network with logic for deactivating information transfer requests (Title).

Claim 4 is dependent on dependent Claim 3. Claim 4 is allowable for at least the same reasons as dependent Claim 3 (and Claim 1), and further because the dependent claim adds the additional feature and limitation "receiving said response to said communicated reservation request; aborting the method for managing access when said response indicates failure to reserve and said first controller is subordinate to said second controller; otherwise, delaying and communicating again a reservation request for said logical I/O device when said response indicates failure to reserve and said first controller is dominant to said second controller; and otherwise, responding, indicating success, to said received reservation request". For at least these reasons, Applicants submit that dependent Claim 4 is distinguished from and allowable over the disclosure of Judd and Hammersley.

As a general proposition, applicants respectfully submit that the cited art of Judd in view of Hammersley, in further view of Barlow fails to disclose or suggest all of the claim limitations and that Claim 4 is novel and not obvious in light of the cited prior art and therefore patentably distinct from it. In addition there is no suggestion or motivation to modify the references in a way that would provide applicant's invention as claimed, or any reasonable expectation that if such references were combined such combination would lead to the invention with any degree of success.

Claim 4 recites *"further comprising the steps of: receiving said response to said communicated reservation request; aborting the method for managing access when said response indicates failure to reserve and said first controller is subordinate to said second controller; otherwise, delaying and communicating again a reservation request for said logical I/O device when said response indicates failure to reserve and said first controller is dominant to said second controller; and otherwise, responding, indicating success, to said received reservation request"*.

The Examiner suggests that Judd discloses (quoting the examiner) "that a secondary controller aborts the access when the primary controller is still functioning (column 8, lines 42-67); such that Judd discloses the aborting access when said response indicates failure to reserve and said first controller is subordinate to said second controller".

As indicated above, Applicants have reviewed the cited portion of Judd and does not find any such specific disclosure or suggestion. Judd, column 8, lines 42-67 specifically describes disks fail-over (column 8, line 50). More specifically, Judd describes fail-over in

the cited section including "Fail-over occurs when an adapter sees that the other adapter has made the transition form a working adapter to a failed state" (column 8, lines 52-54).

Based on the cited passages in Judd, it appears that the Examiner is equating a "fail-over" of Judd with the claimed *"aborting the method for managing access"*.

Applicants respectfully submit that one of the features of the invention is that it provides *"aborting the method for managing access when said response indicates failure to reserve and said first controller is subordinate to said second controller"*.

In contrast to the claimed invention, Judd merely discloses a fail-over such that if a hardware adapter failure occurs a second hardware adapter takes over as the array controller. (Judd, column 8, lines 58-54). Applicants submit that Judd does not disclose or suggest *"aborting the method for managing access when said response indicates failure to reserve and said first controller is subordinate to said second controller"* as claimed and set forth above.

Applicants observe, at col. 8, lines 43-67 that Judd consistently refers to "fail-over". While Applicants do not see the commonality, apparently the examiner is equating the Judd "fail-over" of "disks" to the claimed "logical I/O device", and "fail-over to the claimed "response indicates failure to reserve". Applicants claimed *"aborting the method for managing access when said response indicates failure to reserve and said first controller is subordinate to said second controller"* is not the same as the Judd "fail-over" of "disks".

The Examiner ultimately concedes that Judd does <u>not</u> disclose the delaying and retrying. The Examiner however suggests that Barlow discloses *"the delaying and the communicating again a reservation request for said logical I/O device when said response indicates failure to reserve and said first controller is dominant to said second controller. (column 7, paragraph [not provided])"*. The Examiner further suggests, *"it would have been obvious to one having ordinary skill in the computer art to adopt the teachings of Barlow to Judd and Hammersley because Barlow teaches one to handle the failure exceptions."*

Applicants respectfully take exception to the interpretation of the citations to Barlow and suggests that the Examiner has applied impermissible hindsight using knowledge of the claimed subject matter to read into Judd and Hammersley what is not actually present. For example, the "fail-over" of "disks" disclosed by Judd.

The Examiner suggests that it would have been obvious to one having ordinary skill in the computer art to adopt the teachings of Barlow to Judd and Hammersley because Barlow teaches one to handle the failure exceptions. Applicants respectfully disagree.

The reason or motivation for one skilled in the art to combine the teachings of Judd, Hammersley, and Barlow are unclear. Judd discloses a system for storing data for a plurality of host computers on a plurality of storage arrays, with an emphasis on the "fail-over" of "disks". Applicants fail to see any motivation to adopt Barlow teaching to Judd in view of Hammersley as suggested by the Examiner.

Applicants submit that the cited art fails to disclose or suggest *further comprising the steps of: receiving said response to said communicated reservation request; aborting the method for managing access when said response indicates failure to reserve and said first controller is subordinate to said second controller; otherwise, delaying and communicating again a reservation request for said logical I/O device when said response indicates failure to reserve and said first controller is dominant to said second controller; and otherwise, responding, indicating success, to said received reservation request.* Nowhere in Judd is there any suggestion of a need or desirability to manage access to a logical I/O device, in fact Judd teaches away from any suggestion of such need as the intent is to provide access to each storage array and "fail-over" of "disks". A reference which leads one away from the claimed invention cannot render the invention obvious. See Dow Chemical v. American Cyanamid, 2 USPQ 2d 1350 (Fed. Cir. 1987).

Applicants submit that Judd, Hammersley, and Barlow do not disclose or suggest the limitations recited in Claim 4 and fail to establish a *prima facie* case of obviousness under 35 U.S.C. §103(a). For at least these reasons, Applicants submit that independent Claim 4 is distinguished from and allowable over the disclosure of Judd, Hammersley, and Barlow.

New Claims 24-27

Applicants have added new claims 24-27 directed to other alternative embodiments of the invention to round out the protection to which the applicants are entitled. Although each of the added claim is different, and should separately be examined on an overall claim basis and on an element by element basis, each of the claims recites an element or an element using alternative language that has been distinguished from the cited art to Judd, Hammersley, and Barlow. Applicants have therefore chosen not to repeat such lengthy remarks again for the new claims.

Further Remarks

Applicants respectfully request reconsideration of the above-identified application in view of the preceding remarks and exhibits. In the event that the Examiner identifies any

other issues that would preclude issuing a Notice of Allowance, the courtesy of a telephone call to the undersigned attorney would be appreciated.

Applicants submit that the Claims as amended are supported by the application as filed and do not add new matter. Applicants respectfully request that the Examiner precisely identify teachings or suggestions in the prior art that would preclude patentability of the pending claims in the event that the Examiner is not in a position to allow the claims now pending.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "**VERSION WITH MARKINGS TO SHOW CHANGES MADE**". Attached hereto is a clean version of the claims by the current amendment. The attached page is captioned "**PENDING CLAIMS**".

For the reasons given above, Applicants respectfully submit that the claims, as amended, are now in a condition for allowance, and allowance at an early date would be appreciated. Should the Examiner have any questions or comments, he is encouraged to call the undersigned at (415) 781-1989 to discuss the same so that any outstanding issues can be expeditiously resolved.

Additional Remarks

The Commissioner is authorized to debit any fees associated with this Communication to Deposit Account 50-2319 (Order No. A-66977/RMA/KRG) that have not otherwise been paid, including fees for any added claims or fees for Petition for Extension of time that may be required.

Respectfully submitted,

Date: 4/29/2003

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Attachment: (1052680v3 PA)

1   <u>**VERSION WITH MARKINGS TO SHOW CHANGES MADE**</u>

2   **In the Claims**

3

4   1. (Amended Twice) A method for managing access to <u>a logical</u> [an] I/O device, said

5   method comprising:

6   communicatively coupling first and second nodes, having respective first and second

7   bus controllers, and <u>said</u> [a] logical I/O device, by means of a bus and said first and second

8   bus controllers;

9   receiving on said first controller a request to reserve said logical I/O device; and

10   communicating by means of said bus from said first to said second controller a

11   reservation request for said logical I/O device for execution by said second controller, in

12   response to said receiving.

13

14   2. (Previously Amended) The method of claim 1, further comprising the step of:

15   reserving said logical I/O device for said first node within said second controller, in

16   response to said communicated reservation request.

17

18   3. (Amended Twice) The method of claim 2, wherein said step of reserving further

19   comprises:

20   determining whether said logical I/O device is already reserved within said second

21   controller;

22   communicating a response, indicating failure to reserve said logical I/O device, to said

23   first node when said logical I/O device is already reserved; and

24   otherwise, reserving said logical I/O device for said first node within said second

25   controller, and communicating to <u>said</u> [sa id] first node a response indicating success in

26   reserving said logical I/O device.

27

28   4. (Previously Amended) The method of claim 3, further comprising the steps of:

29   receiving said response to said communicated reservation request;

30   aborting the method for managing access when said response indicates failure to

31   reserve and said first controller is subordinate to said second controller;

32   otherwise, delaying and communicating again a reservation request for said logical

33   I/O device when said response indicates failure to reserve and said first controller is dominant

34   to said second controller; and

1   otherwise, responding, indicating success, to said received reservation request.

2

3   5. (Previously Amended)   The method of claim 1, wherein said step of

4   communicatively coupling further comprises:

5   communicatively coupling said first and second nodes and said logical I/O device

6   depending from a multi-logical-device, third controller by means of said bus and said first

7   and second controllers.

8

9   6. (Original) The method of claim 1, wherein after said step of receiving and before

10   said step of communicating, the following steps are performed:

11   in response to said reservation request, determining whether said logical I/O device is

12   already reserved within said first controller, and aborting said method for managing access

13   when said logical I/O device is already reserved; and

14   otherwise, reserving said logical I/O device for said first node within said first

15   controller.

16

17   7. (Previously Amended) A computer-readable medium for data storage wherein is

18   located a computer program including instructions for causing a first node in a computer

19   system, having a first bus controller, to manage access to a logical I/O device in said

20   computer system by:

21   receiving on said first controller a request to reserve said logical I/O device; and

22   communicating in response to receiving said request, a reservation request for said

23   logical I/O device from said first controller to a second controller of a second node for

24   execution by said second controller.

25

26   8. (Previously Amended) The computer-readable medium of claim 7, wherein said

27   computer program further including instructions causing access management by:

28   reserving said logical I/O device for said first node within said second controller, in

29   response to said reservation request communication.

30

31   9. (Previously Amended) The computer-readable medium of claim 8, wherein said

32   computer program instructions causing said reserving further comprise instructions for:

33   determining whether said logical I/O device is already reserved within said second

34   controller;

1   communicating a response, indicating failure to reserve said logical I/O device, to said

2   first node when said logical I/O device is already reserved; and

3   otherwise, reserving said logical I/O device for said first node within said second

4   controller, and otherwise, reserving said logical I/O device for said first node within said

5   second controller, and communicating to said first node a response indicating success in

6   reserving said logical I/O device.

7

8   10. (Previously Amended) The computer-readable medium of claim 7, wherein after

9   said receiving and before said communicating, said computer program further including

10   instructions for:

11   determining, in response to said reservation request, whether said logical I/O device is

12   already reserved within said first controller, and aborting said method for managing access

13   when said logical I/O device is already reserved; and

14   otherwise, reserving said logical I/O device for said first node within said first

15   controller.

16

17   11. (Amended Twice) A computer system comprising:

18   at least one logical [an] I/O device;

19   first and second nodes having respective first and second bus controllers, said first

20   controller comprising:

21   a computer-readable medium storing a computer program for managing access to said

22   logical I/O device by a first node in said computer system, said computer program including

23   instructions for: receiving on said first controller a request to reserve said logical I/O device;

24   and communicating in response to receiving said request, a reservation request for said

25   logical I/O device from said first controller to a second controller of a second node for

26   execution by said second controller; [and]

27   a CPU, coupled to said computer-readable medium, for executing said computer

28   program stored in said medium; and

29   a bus communicatively coupling said first and second nodes and said logical I/O

30   device by means of said first and second controllers.

31

32   12. (Previously Amended) A method for managing access to a logical I/O device,

33   said method comprising:

1   communicatively coupling first and second nodes having respective first and second

2   bus controllers, and said [a] logical I/O device, by means of a bus and said first and second

3   controllers;

4   receiving, on said first controller, a request to release said logical I/O device; and

5   communicating a release request for said logical I/O device over said bus from said

6   first controller to said second controller for execution by said second controller, in response

7   to said receipt of said request to release.

8

9   13. (Original) The method of claim 12, wherein before said step of receiving, the

10   following steps are performed:

11   receiving on said first controller a request to reserve said logical I/O device; and

12   communicating by means of said bus from said first to said second controller a

13   reservation request for said logical I/O device for execution by said second controller, in

14   response to said receiving a reservation request.

15

16   14. (Previously Amended) The method of claim 12, further comprising the step of:

17   releasing said logical I/O device within said second controller, in response to said

18   release request communication.

19

20   15. (Previously Amended)   The method of claim 12, wherein said step of

21   communicatively coupling comprises:

22   communicatively coupling said first and second nodes and a logical device depending

23   from a multi-logical-device, third controller by means of said bus and said first and second

24   controllers.

25

26   16. (Previously Amended) A computer-readable medium for data storage wherein is

27   located a computer program for causing a first node in a computer system, having a first bus

28   controller, to manage access to a logical I/O device in said computer system by:

29   receiving on said first controller a request to release said logical I/O device; and

30   communicating by means of a bus from said first controller to a second controller of a

31   second node a release request for said logical I/O device for execution by said second

32   controller, in response to said receiving.

33

1   17. (Previously Amended) The computer-readable medium of claim 16, wherein said

2   computer program further manages access by:

3   releasing said logical I/O device within said second controller, in response to said

4   release request communication.

5

6   18. (Amended Once) A computer system comprising:

7   first and second nodes having respective first and second bus controllers, said first

8   controller comprising

9   the computer-readable medium of claim 16; and

10   a CPU, coupled to said medium, for executing said computer program in said

11 medium;

12   [an] a logical I/O device; and

13   a bus communicatively coupling said first and second nodes and said logical I/O

14 device by means of said first and second controllers.

15

16   19. (Original) An apparatus for managing access to a logical I/O device, said

17 apparatus comprising:

18   means for communicatively coupling first and second nodes, having respective first

19 and second bus controllers, and a logical I/O device;

20   means for receiving on said first controller a request to reserve said logical I/O device;

21 and

22   means for communicating from said first to said second controller a reservation

23 request for said logical I/O device for execution by said second controller, in response to said

24 receiving.

25

26   20. (Original) An apparatus for managing access to a logical I/O device, said

27 apparatus comprising:

28   means for communicatively coupling first and second nodes, having respective first

29 and second bus controllers, and a logical I/O device;

30   means for receiving on said first controller a request to release said logical I/O device;

31 and

32   means for communicating by means of said bus from said first to said second

33 controller a release request for said logical I/O device for execution by said second controller,

34 in response to said receiving.

1

2   21. (Amended Once) An apparatus for managing access to [an] a logical input/output

3 device, said apparatus comprising:

4   a communications link coupling first and second nodes each having respective first

5 and second bus controllers to the logical input[an i nput]/output device;

6   input logic on said first controller receiving a request to reserve [said] the logical

7 input/output device; and

8   communications logic communicating from said first controller to said second

9 controller a reservation request for [said] the logical input/output device for execution by said

10 second controller, in response to said receiving.

11

12   22. (Amended Once) The apparatus in claim 21, wherein the logical input/output

13 device is selected from a plurality of logical input/output devices coupled with a physical

14 input/output device[said input/output device comprises a logical input output device].

15

16   23. (Original) The apparatus in claim 21, wherein said communications link

17 comprises a bus.

18

19   24. (New) The method of claim 1, wherein said communicatively coupling further

20 comprises said logical I/O device is stored on a plurality of physical I/O devices.

21

22   25. (New) The method of claim 1, wherein said communicatively coupling further

23 comprises said logical I/O device is selected from a plurality of logical I/O devices, with each

24 logical I/O device defined in part on a common physical I/O device.

25

26   26. (New) The system of claim 11, wherein said logical I/O device spans a plurality

27 of physical I/O devices, and said reservation request reserves said logical I/O device without

28 reserving each of said plurality of physical I/O devices.

29

30   27. (New) The system of claim 11, wherein said logical I/O device is selected from a

31 plurality of logical I/O devices, each of said plurality of logical I/O devices coupled with at

32 least one common physical I/O device, and said reservation request is executed by said

1   second controller to reserve said logical I/O device without reserving said at least one

2   common physical I/O device.